ceeding 230 revolutions per second,[1] gave a total change of direction of nearly 8°. And this largeness of the measured angle materially contributed to enhance the accuracy of the results. Highly effective, also, for the same end were the elaborate precautions for darkening the telescopic field of view, and thus rendering the image of the illuminated slit more distinct. As their upshot, daylight was reduced to about one-thousandth its normal intensity. What was left only just sufficed to show the spider-lines without artificial light. The necessity for such precautions may be estimated from our author's statement that a concave mirror, of which the diameter should be one decimetre for each kilometre of distance, would receive only 1/60,000 part of the light reflected from the revolving mirror; while of that 60,000th part only a small fraction could be practically turned to account, owing to the many sources of loss in reflection and transmission. Since, however, *two* fixed mirrors, each four decimetres across, placed at a distance of less than four kilometres, were employed in the operations at Fort Myer, the proportion of light there returned was rather more than double the above estimate. Prof. Newcomb appears to have been, on the whole, eminently successful in his optical arrangements. The imperfect definition which was the besetting difficulty of Michelson's experiments gave him little trouble.

The recent American determinations of the velocity of light, justly considered as of far superior precision to any others yet executed, give the following results:—

Michelson, at Naval Academy, in 1879	299,910	km.
Michelson, at Cleveland, 1882	299,853	„
Newcomb, at Washington, 1882, using only results supposed to be nearly free from constant errors	299,860	„
Newcomb, including all determinations	299,810	„

To these are added for comparison:—

Foucault, at Paris, in 1862	298,000	„
Cornu, at Paris, in 1874	298,500	„
Cornu, at Paris, in 18/8	300,400	„
The same, discussed by Listing	299,990	„
Young and Forbes, 1880-81	301,382	„

Prof. Newcomb's finally-concluded result is that light travels *in vacuo* at the rate of 299,860 ± 30 kilometres per second. And the probable error of thirty kilometres, small as it is, has been liberally estimated. A determination so satisfactory of this important element goes far towards solving the problem of the sun's distance. Combined with Nyrén's constant of aberration, 20″·492, it gives, for the solar parallax, the value of 8″·794. The corresponding distance of 149·61 million kilometres, or 92,965,020 miles, agrees quite closely with Dr. Gill's result from the opposition of Mars in 1877, and exceeds by only 165,020 miles the mean deduced by Mr. D. P. Todd from earlier determinations of light-velocity. No information as to the dimensions of the solar system which we are ever likely to get from a transit of Venus can approach in reliability the present conclusion.

Prof. Newcomb is so far from believing that the *ne plus ultra* of accuracy has been reached in his own remarkable experiments, that he appends to the detailed description of their method some valuable suggestions for its improvement. He had hoped, indeed, he tells us, to reach a concluded value exact to between five and ten kilometres, which, after repeated verification, might be available as a test of the invariability of standards of length. The further prosecution of the inquiry, however, he now leaves to any physicist who may be invited to the task by the promise of his advice and co-operation.

Fundamentally, he holds that the system pursued at Fort Myer in 1880-82 is preferable to any other yet tried. No known expedient for ascertaining the rate of transmission of light is comparable to that of its deflection, after a measured journey, by a moving mirror. The apparatus by which this plan was realised admits, however, in his opinion, of some amelioration in detail. The disadvantageous necessity, for instance, of appropriating a separate section of the reflecting surface to the outward- and homeward-bound rays could be removed by the substitution of a pentagonal for a quadrangular prism, as shown in Fig. 3, where M is a section of the revolving mirror, J the object-glass of the sender, receiving light from the slit S, and throwing it in the direction P towards the distant reflector. On its return along the path P′, the ray is reflected from an adjoining face of the revolving mirror into the receiving telescope, K.

The closing words of the paper under review attest the unappeased aspiration towards accuracy characteristic of the successful investigator.

"A still further perfection of the method," its author writes, "which would lead to a result of which the precision would be limited only by our means of linear measurement is, I conceive, within the power of art. It consists in placing the fixed mirror at so great a distance that the pentagonal revolving mirror would move through an arc of nearly 36° while the ray is going and returning. If a speed of 500 turns per second could be attained, the required distance would be thirty kilometres. Then, in opposite directions of rotation, the return ray would be reflected at phases of the mirror differing by the angle between two consecutive faces. The result would be that the receiving telescope would need to have but a small motion, and all the observer would have to measure would be the small angle by which the difference of positions of the mirror when the flash was received in opposite directions of rotation, differed from 72°. In the Rocky Mountains or the Sierra Nevada no difficulty would be found in finding stations at which a return ray could be received from a distance of thirty, forty, or even fifty kilometres, with little more dispersion and loss than at a distance of four kilometres through the air of less favoured regions. It is true that the surface of the distant reflector would have to be increased in proportion to the distance, but it would not be necessary to make a single reflector of great size. A row of ten reflectors, each six or eight decimetres in diameter, might be sufficient to insure the visibility of the return ray."

A. M. CLERKE

[1] Michelson's revolving mirror executed 256 turns in a second.

NOTES

AT a meeting of the Royal Society of Edinburgh on June 7, medals were presented as follows:—To Mr. John Aitken (Darroch), the Keith Prize for 1883-85, for his paper on the formation of small clear spaces in dusty air, and for previous papers on atmospheric phenomena; to Edward Sang, LL.D., the Makdougall-Brisbane Prize for 1882-84, for his communication on the need for decimal subdivisions in astronomy and navigation and on tables requisite therefor, and generally for his recalculation of logarithms both of numbers and of trigonometrical ratios; to Mr. B. N. Peach the Neill Prize for 1883-86, for his contributions to the geology and palæontology o Scotland.

THE organising committee of Section A has arranged that a special discussion shall be held, at the Birmingham meeting of the British Association, jointly with Section D, on the physical and physiological theories of colour-vision. The discussion will be opened by Lord Rayleigh, and Dr. Michael Foster will also take part in it. Persons who wish to contribute papers bearing on the subject of discussion are requested to send their names to the Recorders of Sections A or D, at 22, Albemarle Street, W., not later than August 1.

THE death is announced, in his seventieth year, of Mr. Llewellyn Jowett, the well-known archæologist.

AT the Conference at the Colonial and Indian Exhibition on Wednesday, June 23, a paper was read by Mr. W. Lant Carpenter, on "The Position of Science in Colonial Education." The colonies to which Mr. Carpenter had directed his attention were:—Canada generally; South Africa, the Cape of Good Hope and Natal; Western and South Australia, Victoria, New South Wales, Queensland, New Zealand, and Tasmania, the last of which, unfortunately, is not represented at the present Exhibition. An account of the present condition of scientific education in each of these colonies was given. As a general conclusion, Mr. Carpenter thought that the claims of science to a place in State-aided primary education were more fully recognised than in the old country, and this, not merely because it was the only foundation upon which a system of technological education could be securely built, but for its value in drawing out the minds of the pupils. As regards the branches by which the time-honoured routine of subjects may be most beneficially varied, precedence was almost universally accorded to drawing, and to the objective presentation of the elements of science. In secondary grammar and high schools, however, science scarcely occupied a position equal to that in corresponding English schools, but there were many signs of improvement in this respect. In the Colleges and Universities of the older colonies the classical and academic influence was still very strong, while in the newer ones the claims of scientific education to be put on an equal footing with literary were recognised. Great has had been the progress of public opinion in England during the last few years on the importance of science as an element in education, the author was disposed to consider it greater in the colonies in the same period. Certainly the development of that opinion to its present point had been much more rapid in the colonies than at home. There were many voluntary colonial Associations for the promotion of science, and the author concluded his paper by throwing out the suggestion that, if there were grave and practical difficulties in the way of an Imperial federation of the Australian colonies, the establishment of an Australian Association for the Advancement of Science, somewhat on the lines of the British and American Associations for similar purposes, might not be beyond the reach of practical men of science, and he was strongly of opinion that such a federation would tend to strengthen "the position of science in colonial education."

ARRANGEMENTS have been made for the examination in the Indian Court of the Colonial and Indian Exhibition of certain commercial products, which are believed to be insufficiently known or to be suitable for new purposes. Among the substances which will be examined are fibres, silk and silk substitutes, drugs, tobacco, gums and resins, minerals, oils, oil-seeds and perfumery, dyes, mordants and pigments, timbers, tanning materials and leather, and food-stuffs. Any visitors to the Exhibition, who are interested in the subject, will be permitted to attend these examinations of products, which will take place in the Commercial Room, attached to the Economic Court, where all further information may be obtained. Should the results of this examination render such a course desirable, Conferences of a formal character will probably be held at a later date.

THE International Society of Electricians has decided upon building laboratories for the use of physicists in Paris. They will be established in the grounds of the old Collège Rollin, granted by the city of Paris, in the vicinity of the School of Practical Physics recently erected by the Municipal Council. The funds will be supplied by public subscription, a contribution from the Society, and a sum of 360,000 francs, which is the surplus of the last Electrical Exhibition organised by M. Cochery.

WE take the following from *Science*:—It will be remembered that in the month of May a gentleman in Brooklyn died from hydrophobia. His medical attendants, competent physicians, had no doubt about their diagnosis, and his symptoms were characteristic of that disease. Confirmatory of this opinion, the autopsy revealed no lesion to which could be attributed the symptoms from which he suffered—a condition which is also characteristic of hydrophobia. Portions of the brain and the spinal cord were carefully wrapped in cloth wet with a solution of bichloride of mercury and sent to Dr. Sternberg. Small portions of these were thoroughly mixed with sterilised bouillon; and this broth was then, by means of a hypodermic syringe, injected under the dura mater covering the brain of a rabbit, a small button of bone having been first removed by a trephine. The wound was then closed by sutures. Three rabbits were thus operated upon. One died at the end of twenty-four hours as the result of the operation; hydrophobia, of course, having nothing to do with it. Another is now, after eighteen days, apparently well. The third one, on the sixteenth day, commenced to show signs of being ill: he was disinclined to move, and in a few hours evidences of paralysis appeared, at first in the hind-legs, and subsequently in all the extremities. On June 5, the eighteenth day after the operation, he died. The wound had healed, and there were no evidences of inflammation. The brain showed no softening at the point where the inoculation was made, no pus, nor any evidences of inflammation either of the brain substance or of its membranes. The cord also appeared normal. Portions of the medulla of this rabbit were immediately mixed with sterilised bouillon, and two rabbits were inoculated in the same manner as has been described. This case is of great interest as being, so far as we know, the first animal in this country to become affected with hydrophobia from inoculation with material taken from a person who died from that disease. If Dr. Sternberg is as successful with these rabbits as with the first, there is no reason why the series cannot be continued, and thus the protective virus of Pasteur be obtained in this country, and a trip to Paris by the victims of dog-bites made unnecessary. As we go to press we learn that the second rabbit, mentioned above as remaining unaffected for eighteen days, shows unmistakable signs of hydrophobia.

DR. THORNTON, the new Director of the Madras Museum, has organised a series of investigations for the purpose of studying systematically the marine and terrestrial fauna on the west coast of the Presidency. They will be continued from time to time as favourable opportunities arise.

AT 8.40 a.m. on May 17 a remarkable phenomenon was witnessed at Dönnæs, in the north of Norway, some twenty five miles south of the Polar Circle. A small bright horizontally-lying circle was suddenly seen with its centre right in zenith, the periphery passing through the centre of the sun. In the circle were besides four mock suns, in east, west, north, and south, so that they would almost have formed the corners in an irregular square. There was also another circle perpendicular on the other, and with the sun as centre, but it was much fainter. The little circle and the two mock suns nearest the sun were rainbow-coloured, and the great circle and the two mock suns furthest off intense white. After half an hour the phenomenon faded for a while, but soon again became as intense as before. It disappeared after having been in view for an hour and a half. The weather was fine and sunny, but hazy. Afterwards it became cloudy with rain.

THE large zoological collection known as the Museum Godeffroy has just been purchased by Mr. Damon (Weymouth). The ethnological portion was sold a short time since to the Leipzig Museum, as already announced in NATURE.

IN addition to the specially meteorological results contained in the report of the Hong Kong Observatory for the past year,

which we noticed last week, Dr. Doberck, the Government Astronomer there, refers to the great value of the systematic meteorological observations with verified instruments which have lately been set on foot at many of the stations and lighthouses of the Chinese Customs, and which will serve as an important aid in the investigation of typhoons. He pays a well-deserved tribute to Japan's "extensive meteorological service, conducted on approved principles," and to the useful weather maps issued by the Tokio Observatory, while he deplores the absence of a similar comprehensive service in the Philippines and the non-publication of such data as are observed there—an omission which increases the labour of following typhoons in their passage across or near to those islands. The intention of the French authorities to establish a meteorological observatory at Haiphong, on the coast of Tonquin, seems to have been dropped, at least for a time, since the death of the distinguished meteorologist, Dr. Borius. The Hong Kong Observatory during the year was supplied with a gazing-telescope, as was recommended by Col. Palmer in the original project, a Lee equatorial from Greenwich having been erected. In 1882, when the plan of the Hong Kong Observatory was first drawn up, the local Government was willing to pay for one thoroughly equipped, but the Colonial Office at home cut out the most important part of the provision for magnetic research, and this unfortunate spirit of parsimony in expenditure connected with scientific research seems now to have extended to Hong Kong. For Dr. Doberck complains that the addition to the work of his Observatory is not accompanied by a corresponding increase of funds and staff, that his telegraphic facilities are insufficient to give full effect to the proper purposes of the establishment, that the slopes of the observatory hill have been left unturfed since they were stripped in 1883, and that no effective measures have been taken to improve the unhealthiness of the site, which is on the Kowloon peninsula opposite the town of Victoria. It sounds incredible that the gun which was supposed to be set apart for the purpose of announcing the approach of a typhoon has also been used to announce the arrival of the mail-steamers—a course which is as senseless as it is cruel, for it confuses the unfortunate boat- and junk-men who swarm in the Hong Kong waters, and who either throw up their work and flee into a place of refuge when only a mail-steamer is arriving, to their great loss of time and money, or they take no precautions at all when a typhoon is really at hand. In the latter case, if any lives were lost, an English coroner's jury would probably indict the official responsible for this gross negligence for manslaughter, as they would the chemist who carelessly gives strychnine in place of Epsom salts. Dr. Doberck proposes that, if the gun be used for post-office purposes, it should cease altogether as a typhoon warning.

AT the annual meeting of the Chemical Society of Tokio, held on April 10, and reported in the *Japan Mail*, a very satisfactory report was read. The Society is composed of Japanese and foreign men of science, the total number of members last year being eighty-six, and being constantly on the increase. The number of papers read amounted to nineteen. The journal of the Society is published four times a year, and it is hoped to make it a monthly journal soon, "especially as the number of papers read is not few, nor their nature inferior to those which appear in foreign journals." The Society undertook to translate chemical terms into Japanese about four years ago, and it now possesses (though not yet published) a dictionary of commoner chemical terms in Japanese, English, French, and German. It has also undertaken to establish a system of chemical nomenclature in the Japanese language, of which the nomenclature of the elements and of inorganic compounds is already nearly finished. It is hoped that a sound and complete system of nomenclature will be published in the course of the coming year. An address was delivered by Mr. Watanabe, the head of the new University of Japan, and, on other grounds, an important official, who impressed on the members of the Society the necessity of making chemistry popular, on account of its intimate connection with arts and manufactures. He hoped, too, that more and more original work in science would be done in Japan, for on such work depended ultimately all improvement in manufacturing processes.

AT the same meeting a paper was read by Dr. Kellner on the deportment of urea towards soils, with special reference to the mode of manuring the soil employed in China and Japan. The experiments on this subject which have been carried out at the Komaba Agricultural College show that the application of fresh excreta is injurious to crops, and that, in this state, a great deal of the most valuable nitrogenous compounds of the manure is lost by rain, which carries the urea into the deep subsoil beyond the reach of the roots of the plants. Japanese farmers had long ago come to a similar conclusion for themselves, for they only employed this manure when in a highly decomposed state, when the urea had been converted by putrefaction into ammonium carbonate.

THE report of the Rugby School Natural History Society for the past year is a very satisfactory one, for it shows great activity on the part of the members and of the Society collectively in every direction. With a single exception the papers are contributed by working members or associates; the collection of British quadrupeds commenced last year is almost complete, and a new vivarium has been added to the Society's resources. The papers deal with many subjects from China to heraldry, but local ornithology appears to have received special attention; for the Society's first prize essay was won by Mr. Austen with a paper on the water-birds of Rugby; the second by Mr. Mander, on some of the large birds round Rugby. Mr. Solly also contributes an interesting paper on microscopic fungi, with illustrations. But it is in the sectional reports that the activity of the Society is made most manifest. Here we find a meteorological report, based on continuous observation throughout the year; a vivarium report; a report from the entomological section, containing a list of the Lepidoptera observed at or near Rugby during the year; similarly the report of the botanical section contains a long list of observations, in which are some plants hitherto unknown in the flora of Rugby; the zoological report, it may be added, is a specially long one; and the book concludes with the report of the Temple Observatory, where so much good astronomical work is being done. Of the many excellent natural history societies which pass under our notice from time to time, few can show more or better work than the Rugby School Society.

ONE interesting matter referred to in the report just noticed was the presentation of an address of congratulation to Mr. M. H. Bloxam, a very energetic member of the Society, on reaching his eightieth year. In his reply Mr. Bloxam claimed to be, in a peculiar degree, a link between the Rugby of the present and that of the past. He transacted business with a Rugbeian who entered the school in the reign of George II., 127 years ago. Mr. Bloxam entered Rugby School about 72 years ago, and left it 64 years ago; and while he was at the school a retired master died who was born in 1718, early in the reign of George I., 167 years ago. The Rev. Henry Holyoak was master of the school in the boyhood of that retired old master, and Mr. Holyoak was alive in the lifetime of a nephew of Lawrence Sheriff, the founder of Rugby School. Now Lawrence Sheriff died 318 years ago. Thus three lives, one of them being Mr. Bloxam's, carry us back to the foundation of Rugby School.

We are requested to state that the annual Students' *Conversazione* will take place at the Finsbury Technical College on Friday evening, July 2, commencing at 7 o'clock. A good exhibition of apparatus, models, and specimens has been arranged to illustrate the various branches of applied science and art comprised under the College scheme of technical education.

A Swedish geologist, Dr. H. Sjögren, is about to proceed to the naphtha regions on the Caspian Sea, in order to prosecute geological studies.

We have received from Messrs. Griffin and Co. the third annual issue of the "Year-Book of the Scientific and Learned Societies." It gives a brief chronicle of the work done during the year by the various Societies, together with the necessary information as to official changes.

The Saghalien Ainos do not exhibit the same uncouthness as those of Yezo; there is a greater absence of beards and of hairy bodies generally. The hue of the skin very closely resembles that of the Caucasian; the foreheads are high but narrow, and their general bearing and facial expression denote an intelligence much superior to that of the Yezoines. As for the theory of an ethnical connection between the Ainos and the Japanese, Mr. Penhallow says that an examination of the pure types would not permit such a belief to be entertained. There is a mixture of the two in places, but the half-breed is as easily recognisable there as elsewhere in the world. The Japanese, he concludes, are unquestionably Mongoloid, while the facts show the Ainos to be physically distinct, while the best authorities agree in the great resemblance which they bear to Europeans, the prevailing view being that they are distinctly Aryan.

The additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus* ♀) from India, presented by Mrs. George Willing; two Tcheli Monkeys (*Macacus tcheliensis* ♂ ♀) from Jung-ling, near Pekin, presented by Dr. S. W. Bushell, C.M.Z.S.; a Wild Swine (*Sus scrofa* ♀) from Tangier, presented by Mr. John Brooks; four Sparrow Hawks (*Accipiter nisus*), British, presented by Mr. J. Rowland Ward, F.Z.S.; an Egyptian Goose (*Chenalopex ægyptiaca*), a Robben-Island Snake (*Coronella phocarum*), a Hoary Snake (*Coronella cana*), an Infernal Snake (*Boodon infernalis*), a Rhomb-marked Snake (*Psammophylax rhombeatus*), a Horned Viper (*Vipera cornuta*), eight Geometric Tortoises (*Testudo geometrica*), a Leopard Tortoise (*Testudo pardalis*), three Areolated Tortoises (*Homopus areolatus*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Crowned Horned Lizard (*Phrynosoma coronatum*) from California, presented by Mr. S. Upton Robins; a Common Viper (*Vipera berus*), British, presented by Mr. W. H. B. Pain; a Tuatera Lizard (*Sphenodon punctatus*) from New Zealand, presented by Capt. R. Sutherland; a Tarantula Spider (*Mygale*, sp. inc.) from Bahamas, presented by Mrs. E. Blake; a Peruvian Thicknee (*Œdicnemus superciliaris*) from Peru, two White-backed Piping Crows (*Gymnorhina leuconota*) from Australia, deposited; a Balearic Crane (*Balearica pavonina*) from West Africa, purchased; a Japanese Deer (*Cervus sika*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

The Absorption Spectrum of Oxygen.—About three years ago M. Egoroff was able to show that the great groups A and B in the solar spectrum were due to the absorption of oxygen. More recently the α band was also found to be due to the same gas. M. Janssen, studying the absorption of oxygen has now discovered that under certain conditions the gas yields another spectrum, composed no longer of lines easily separated, but of shaded bands which can only be resolved with great difficulty. This system of bands appears for moderate pressures much later than the spectrum of lines; but it shows itself very quickly with increase of the density: the two systems are so different that it is possible to obtain either the first without the second or *vice versâ*. M. Janssen was at first unable to explain how it was that these bands were not visible in the solar spectrum when they were easily obtained by passing light through thicknesses of oxygen far less than the sun's light has to traverse before reaching us. But further experiments showed that these bands did not develop in proportion to the thickness of the stratum of oxygen producing them, multiplied by its density, but in proportion to the thickness multiplied by the square of the density. The density of our atmosphere being small as compared with some of the pressures at which M. Janssen worked, the non-appearance of these bands amongst the telluric lines of the solar spectrum is readily explained.

Potsdam Observatory.—The fifth volume of the *Publications* of the Astrophysical Observatory of Potsdam is occupied with a very careful determination, by Drs. Müller and Kempf, of the wave-lengths of 300 of the principal lines in the solar spectrum. Four gratings were used in this inquiry—one with about 2500 lines to the inch, the second with 6250 lines, and the third and fourth with about 10,000 lines to the inch. Eleven normal lines were first measured with all four gratings and in the spectra of three or four orders with each grating, every observation being carefully corrected for temperature, &c. The computation of the wave-lengths of the 300 lines follows, and the details of the reduction of the observations of the eleven normal lines, and a catalogue of the wave lengths of 2614 lines as given in the Potsdam Atlas of the spectrum, and as now corrected, concludes the work. The following are the wave-lengths of the selected normal lines, expressed in millionths of a millimetre:—C, 656·314, 640·035, 612·247; D_2, 589·625, 562·475, 545·580; b_2, 517·284, 495·770, 470·321, 441·534, and 407·186. It would seem from these determinations that Ångström's wave-lengths require small but sensible corrections.

The Binary Star γ Coronæ Australis.—With reference to our note on this double star (Nature, vol. xxxiii. p. 425), in which we pointed out the large difference in the position-angles computed, for the present year, from the orbit of Mr. Gore and from that of Mr. Downing, we may draw attention to a communication by Mr. H. C. Wilson, of the Cincinnati Observatory, printed in the *Observatory*, No. 111, pp. 234–235. Mr. Wilson gives the mean results of observations of the binary in 1881 and 1883 as follows:—

				°	″
1881·72	...	...	...	45·53	1·38
1883·62	...	...	...	37·75	1·62

The angles computed from Mr. Gore's elements for these two epochs are respectively 47°·29 and 36°·49, which may be regarded as agreeing fairly well with the observations. It appears, therefore, that of the two orbits referred to above, Mr. Gore's is by far the most satisfactory.

Observations of the Companion of Sirius.—Prof. Young has communicated to the *Sidereal Messenger* (No. 46, p. 182) a series of measures of the companion of Sirius made at Princeton, for the most part with the 23-inch refractor, with powers of 460 and 300. Prof. Young remarks that during the present year the companion has been a difficult object, except when the seeing was good, and there have been fewer good nights than usual. The mean annual results are:—

Position-Angle			Distance		
Epoch	Measure	No. of nights	Epoch	Measure	No. of nights
1883·105 ...	39°·0 ...	1 ...	1883·105 ...	9″·41 ...	1
1884·273 ...	36·30 ...	5 ...	1884·270 ...	8·70 ...	4
1885·112 ...	34·06 ...	7 ...	1885·089 ...	8·09 ...	8
1886·047 ...	29·77 ...	4 ...	1886·049 ...	7·59 ...	3

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JUNE 27—JULY 3

(For the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on June 27

Sun rises, 3h. 47m.; souths, 12h. 2m. 44·1s.; sets, 20h. 19m.; decl. on meridian, 23° 20′ N.: Sidereal Time at Sunset, 14h. 42m.